IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the present application:

Claims 1-91 (Cancelled)

92. (Currently Amended) A method of preparing a substrate for adherence of a material thereto, the substrate having a surface, the method consisting essentially of [comprising] the steps of:

a) generating an active zone using an electromagnetic radiation source; and

b) exposing the surface of said substrate to the active zone, whereby the surface of the substrate is chemically modified for adhering the material onto said substrate by exposure to the active zone, wherein the substrate is exposed to electromagnetic radiation in the active zone including continuous ultraviolet radiation having a wave length in the range of about 150 nanometers to 400 nanometers and wherein the step of exposing occurs at substantially ambient pressure.

93. (Previously Presented) The method of claim 92, wherein the substrate includes a polymer.

94. (Previously Presented) The method of claim 92, wherein said substrate includes a sole of a shoe.

95. (Previously Presented) The method of claim 92, wherein said substrate includes a composite used in aircraft and space vehicle fabrication.

96. (Previously Presented) The method of claim 92, wherein said substrate includes a component used in automobile manufacturing.

97. (Previously Presented) The method of claim 92, wherein said substrate includes a well plate, wherein said well plate is used for biochemical analysis.

Claims 98 - 100 (Cancelled)

101. (Previously Presented) The method of claim 92, wherein the intensity of said electromagnetic radiation at the surface of the substrate ranges from about 2.0 joules per square centimeter to about 5,000 joules per square centimeter.

102. (Previously Presented) The method of claim 92, wherein the intensity of said electromagnetic radiation at the surface of the substrate ranges from about 10 joules per square centimeter to about 1000 joules per square centimeter.

103. (Previously Presented) The method of claim 92, wherein the step of exposing includes conveying the substrate through said active zone using a conveyor system whereby the substrate is exposed to the active zone for a residence time.

104. (Previously Presented) The method of claim 103, wherein the residence time is in a range of from about 0.1 seconds to about 10 seconds.

105. (Previously Presented) The method of claim 103, wherein the residence time is in a range of from about 0.2 seconds to about 5 seconds.

106. (Original) The method of claim 103, wherein the conveyor system further includes a conveyor belt for carrying the substrate.

107. (Previously Presented) The method of claim 103, further comprising the step of evacuating the active zone in a location adjacent to the conveyor system.

108. (Previously Presented) The method of claim 92, further comprising the step of exposing the substrate to a discharge from an electro-ionization device.

109. (Original) The method of claim 108, wherein the electro-ionization device is located in the active zone.

110. (Previously Presented) The method of claim 108, further comprising the step of circulating a gas proximate said electro-ionization device so that said gas flows over the electro-ionization device onto the substrate.

111. (Previously Presented) The method of claim 103, wherein the step of exposing includes exposing the surface of the substrate to infra-red radiation generated by an infra-red radiation source, wherein the surface of the substrate is heated by exposure to the infra-red radiation generated by the infra-red radiation source.

112. (Previously Presented) The method of claim 111, wherein the step of exposing includes exposing the surface of the substrate to the infrared radiation prior to exposing the surface of the substrate to the ultraviolet radiation.

113. (Previously Presented) The method of claim 92, further comprising the step of directing a gas over the surface of the substrate exposed to the active zone.

114. (Previously Presented) The method of claim 113, wherein the gas to be injected over the surface of the substrate exposed to the active zone includes a gas selected from the group consisting of carbon tetrachloride, chloroform, halogen functionality compounds, oxygen functionality compounds, water vapor, oxygen, air, silanes, amine functionality compounds, ammonia and nitrogen.

115. (Currently Amended) A method of preparing a polymer substrate for adherence of a material thereto, the polymer substrate having a surface, the method consisting essentially of [comprising] the steps of:

a) generating an active zone at substantially atmospheric pressure using an electromagnetic radiation source, wherein electromagnetic radiation generated by said

electromagnetic radiation source includes continuous ultraviolet radiation having a wave length in the range of about 150 nanometers to 400 nanometers, and

b) exposing the surface of the polymer substrate to the electromagnetic radiation, wherein the intensity of said electromagnetic radiation at the surface of the substrate ranges from about 0.1 joules per square centimeter to about 50,000 joules per square centimeter, wherein the material is selected from the group consisting of a glue, a coating, an adhesive, a paint and a resinous compound, whereby the surface of the polymer substrate is chemically modified for adhering the material onto the surface of the polymer substrate by exposing the surface to said active zone; the step of exposing including conveying the polymer substrate through said active zone, whereby the surface of the polymer substrate is exposed to the active zone for a residence time, wherein the residence time is in a range of from about 0.2 seconds to about 5 seconds.

Claims 116-118 (Cancelled)

119. (Currently Amended) The method of claim 115, wherein the polymer substrate includes a synthetic polymer.

120. (Currently Amended) The method of claim 115, wherein the polymer substrate includes a naturally occurring polymer.

121. (Currently Amended) A method of preparing a substrate for adherence of a material thereto, the substrate having a surface, the method consisting essentially of

[comprising] the steps of:

a) providing a conveyor system including a conveyor and an electromagnetic radiation source;

b) generating an active zone proximate the conveyor at substantially atmospheric pressure using the electromagnetic radiation source, wherein electromagnetic radiation generated by the electromagnetic radiation source includes continuous ultraviolet radiation having a wave length in the range of about 150 nanometers to 400 nanometers; and

c) exposing the surface of the substrate to the electromagnetic radiation generated by the electromagnetic radiation source, wherein the intensity of said electromagnetic radiation at the surface of the substrate ranges from about 2.0 joules per square centimeter to about 5,000 joules per square centimeter, whereby the surface of the substrate is chemically modified to improve adherence of the material onto the surface of the substrate by exposing the surface to said active zone; the step of exposing including conveying the substrate through said active zone, whereby the surface of the substrate is exposed to the active zone for a residence time, and wherein the residence time is in a range of from about 0.2 seconds to about 5 seconds.

122. (Previously Presented) The method of claim 121, further comprising the step of adhering the material onto the surface of the substrate for the purposed of bonding the material to the substrate, wherein the material is selected from the group consisting of a glue, a coating, an adhesive, a paint and a resinous compound.

123. (Previously Presented) The method of claim 122, further comprising the step of evacuating the active zone adjacent to the conveyor system.

124. (Previously Presented) The method of claim 121, further comprising the steps of exposing the surface of the substrate to an ionized discharge generated by an electro-ionization device; and circulating a first gas stream past the electro-ionization device so that the first gas stream flows past the electro-ionization device and onto the surface of the substrate; wherein the step of providing includes providing a conveyor system further including an electro-ionizing device.

125. (Previously Presented) The method of claim 124, further comprising the step of exposing the substrate to additional radiation, wherein the radiation is infra-red radiation and the step of providing includes providing a conveyor system further including a source of infra-red radiation.

126. (Previously Presented) The method of claim 125, further comprising the step of evacuating the active zone adjacent to the conveyor system.

127. (Currently Amended) The method of claim 125, further comprising the step of adhering the material onto the surface of the [polymer] substrate for the purpose of bonding the material to the substrate, wherein the material is selected from the group consisting of a glue, a coating, an adhesive, a paint and a resinous compound.

128. (Currently Amended) A method of chemically modifying a substrate for adherence of a material thereto, the substrate having a surface, the method consisting essentially of [comprising] the steps of:

a) generating an active zone using an electromagnetic radiation source; and

b) exposing the surface of the substrate to the active zone at substantially ambient pressure, wherein the surface of the substrate is exposed to continuous electromagnetic radiation in a range from about 0.1 joules per square centimeter to about 50,000 joules per square centimeter, said electromagnetic radiation including continuous ultraviolet radiation having a wave length in the range of from about 150 nanometers to 400 nanometers, whereby the substrate is exposed to electromagnetic radiation sufficient to chemically modify the surface of the substrate so that adherence of the material onto the surface of the substrate is enhanced by increasing the [wetability] wettability of the surface.

129. (Previously Presented) The method of claim 128, wherein the material is selected from the group consisting of a glue, a coating, an adhesive, a paint and a resinous compound.

130. (Previously Presented) The method of claim 128, wherein the substrate includes a polymer.

131. (Previously Presented) The method of claim 128, wherein the step of exposing includes conveying the substrate through said active zone with a conveyor

system, whereby the substrate is exposed to the active zone for a residence time, wherein the residence time is in a range of from about 0.2 seconds to about 5 seconds.

132. (Previously Presented) The method of claim 131, further comprising the step of adhering the material onto the surface of the substrate for the purposed of bonding the material to the substrate wherein the material is selected from the group consisting of a glue, a coating, an adhesive, a paint and a resinous compound.

133. (Previously Presented) The method of claim 131, further comprising the steps of exposing the surface of the substrate to an ionized discharge generated by an electro-ionization device; and circulating a first gas stream past the electro-ionization device so that the first gas stream flows past the electro-ionization device and onto the surface of the substrate.

134. (Previously Presented) The method of claim 131, further comprising the step of evacuating the active zone adjacent to the conveyor system.

135. (Previously Presented) The method of claim 131, further comprising the step of exposing the substrate to additional radiation, wherein the radiation is infrared radiation.